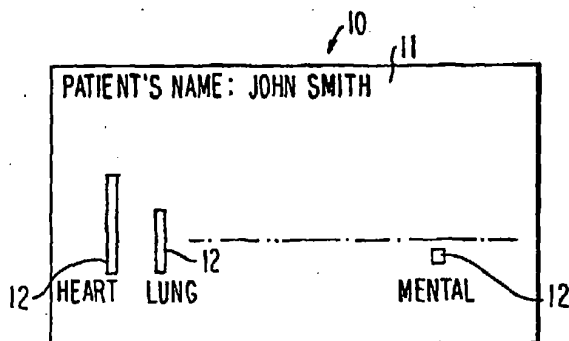


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(54) Title: METHOD FOR GENERATING AND ACCESSING PATIENT SPECIFIC HEALTH INDEX



## (57) Abstract

A method of apprising a health care professional about the overall state of health of a respective patient involves assigning all conditions likely to adversely affect the long-term health of patients to different categories (12) each relating to one of the various human body systems, and rating such conditions within their respective categories in accordance with their seriousness and severity. Then, when the respective patient (11) is examined and any of such conditions is found to exist, an entry is made into a record characterizing the condition by category and rating. This stored information is available to health professionals conducting subsequent examinations of the same patient to alert them to possible problems that patient has, even if these are in an area other than that of their expertise.

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1           **METHOD FOR GENERATING AND ACCESSING**  
2           **PATIENT SPECIFIC HEALTH INDEX**

3           **BACKGROUND OF THE INVENTION**

4       1.   Field of the Invention

5           The present invention relates to the fields of medicine and  
6       allied health professions or practices in general, and more particularly to  
7       the determination and monitoring of the general state of health of patients.

8       2.   Description of the Related Art

9           It is well known in the field of medicine that the more a  
10       physician or other health professional or practitioner knows about the past  
11       afflictions or other influences that may have befallen the patient or affected  
12       his or her overall health, the more likely it is that the diagnosis and/or  
13       treatment of any disease or illness, whether recurring in, or subsequently  
14       contracted or suffered by, that patient, will be the correct one. Yet,  
15       traditionally, this kind of information was included in patients' files that  
16       were kept, usually only for a limited amount of time, in the office of a  
17       physician who had examined and/or treated the particular patient, and/or  
18       at a hospital to which that patient was admitted in the past. If the patient  
19       chose to change physicians, or to be examined by a specialist or a  
20       physician or other health professional with a different area of specialization  
21       than a previous one, or was admitted to a hospital, possibly on an  
22       emergency basis, the only way to make that information available in toto  
23       to such subsequent health professionals was, and in many cases still is, to  
24       forward the patient's file or a copy of its contents to them. This is not  
25       very practical; moreover, the time delay incurred while attending to such  
26       physical transfer may be of critical importance in some cases in that some  
27       crucial information may not reach the subsequent health professional until  
28       after actions affecting the patient's well-being may have already been taken.

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1                   In view of the problems outlined above, it is currently  
2       customary to have the patient or someone acting for him or her prepare  
3       that patient's medical history record for use at a particular facility  
4       (physician's office, hospital, clinic etc.). This is preferably done even  
5       prior to letting the patient see a health professional, especially when that  
6       professional is not familiar with the particular patient and/or his or her past  
7       medical problems or overall health. This is not only cumbersome and  
8       bothersome to the patients in that they have to fill out --usually multipage--  
9       forms, or otherwise answer a panoply of questions about their medical  
10      pasts, but also may not be reliable in that a particular patient may overlook  
11      a potentially important question, or fail to answer it, whether by design in  
12      that he or she desires to conceal such information, or because he or she had  
13      forgotten about having suffered of and/or being treated for a particular  
14      health condition. It also requires that the patient be in full possession of  
15      his or her faculties at the time of giving the medical history, or that another  
16      person familiar with such history be available to give it for him or her, and  
17      that such other person be aware of all pertinent facts. Also, such history  
18      will ordinarily be less than comprehensive not only because it may be felt  
19      that some questions are taboo or sensitive or have little relevance to the  
20      area in which the particular health professional practices or specializes, but  
21      also in that it is desired not to impose undue burden on the patient by  
22      asking too many questions, especially if such questions could be perceived  
23      to be irrelevant to the problem that brought the patient to the facility in the  
24      first place.

25               The advent of the information age has brought with it a veritable  
26      explosion of possibilities for information storage and retrieval. Many  
27      attempts have already been made to capitalize on these developments. So,  
28      for instance, U.S. patent No. 4,878,175 discloses a hospital information  
29      system that renders it possible to store information concerning any

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1 particular patient and to access and/or add to or otherwise alter such  
2 information from a plurality of locations. However, in this system, like in  
3 all other systems of a similar nature that are known to be currently  
4 available, the patient information sharing is limited to a single hospital or  
5 similar health facility.

6 Another use of computer technology is revealed in U.S.  
7 patent No. 4,930,519, where various cardiopulmonary data is collected and  
8 eventually graphically presented in the form of a polygon, wherein the  
9 locations of the corners of such polygon on respective axes (each with its  
10 own scale or graduation) are indicative of the patient's performance in  
11 particular respects related to the cardiovascular function. In this instance,  
12 the area of inquiry (testing) is limited to the specialty, or one of the areas  
13 of competence or expertise, of the particular health professional, and once  
14 more to the particular physician's office, hospital department, hospital or  
15 other health care facility.

16 3. Objects of the Invention

17 Accordingly, it is an object of the present invention to avoid  
18 the disadvantages of the prior art.

19 More particularly, it is an object of the present invention to  
20 provide a method of apprising a health professional who is about to  
21 examine and or treat a particular patient about the overall state of that  
22 patient's health.

23 Still another object of the present invention is to develop the  
24 method of the type here under consideration in such a manner as to alert  
25 the examining health professional to the possible existence of medical  
26 problems which may not directly affect a medical condition in the area of  
27 practice of such professional but may have bearing on the diagnosis,  
28 prognosis and/or treatment of such condition.

29 A concomitant object of the invention is to devise a method

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1 of the above type that is relatively simple to implement in devices that are  
2 either quite inexpensive or already available for other purposes, and easy  
3 to use.

#### 4 SUMMARY OF THE INVENTION

5 In keeping with these objects and others that will become  
6 apparent hereafter, one feature of the present invention resides in a method  
7 of apprising health professionals about the general state of health of their  
8 patients. This method includes conducting at least one medical examination  
9 of the respective patient for the existence of conditions affecting the  
10 patient's health, followed by evaluating the results of that medical  
11 examination. Such an evaluation involves, in accordance with the  
12 invention, assigning each of such conditions that was found to exist in the  
13 respective patient to one of a predetermined number of categories each  
14 relating to a different one of various human body systems, rating the  
15 seriousness of each such particular condition within the category to which  
16 it is assigned on a seriousness scale specific to that category, and recording  
17 at least evaluation data indicative of the results of the assigning and rating  
18 steps regarding the respective patient on a recording medium suitable for  
19 access by other health professionals. In further accord with the present  
20 invention, the thus recorded evaluation data is to be utilized during a  
21 subsequent medical examination of the respective patient to alert an  
22 examining health professional to possible health problems of such patient,  
23 in that the data previously recorded on the recording medium regarding the  
24 respective patient is accessed as an appurtenant to such subsequent  
25 examination to retrieve from the recording medium at least the previously  
26 recorded evaluation data regarding the respective patient. After such  
27 retrieval, there is generated at least one visually perceptible report that  
28 displays the thus retrieved evaluation data by category and rating.

29 A particular advantage of the inventive method as described

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1 so far is that the examining or attending health professional is presented  
2 with an overall "picture" of the respective patient's health and hence is able  
3 to decide, even before examining the patient, what areas of the patient's  
4 body to examine, what possible complications to be alert to when  
5 prescribing treatment, what bearing, if any, problems that the patient may  
6 have in other respects may have on the condition addressed by the  
7 particular professional, etc.

8 It is particularly advantageous when, in accordance with  
9 another aspect of the present invention, this method includes coordinating  
10 the scales of all of the categories with one another so as to be  
11 commensurate with each other such that conditions of comparable  
12 seriousness are rated the same regardless of their category. Under these  
13 circumstances, the generating step may include displaying the evaluation  
14 data graphically by category and position on the respective scales with  
15 substantially the same graduations for all of the scales.

16 In accordance with another advantageous aspect of this  
17 invention, the coordinating step includes collecting background information  
18 about all of the conditions that may afflict each of the various human body  
19 systems, and using such background information for attributing to each of  
20 such conditions a numerical value expressing the seriousness of such  
21 condition relative to others in the same category, and the severity of such  
22 condition. Then, the rating step advantageously includes determining the  
23 severity of the particular condition that has been found to exist in the  
24 patient for ascertaining the numerical value for the condition of such  
25 severity on the scale applicable to its category.

26 The novel features which are considered as characteristic of  
27 the invention are set forth in particular in the appended claims. The  
28 improved method itself, however, together with additional features and  
29 advantages thereof, will be best understood upon perusal of the following

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1 detailed description of certain specific embodiments with reference to the  
2 accompanying drawings.

3 **BRIEF DESCRIPTION OF THE DRAWINGS**

4 Fig. 1 is a graphic representation of an example of an image  
5 displayed on a display medium in the performance of the method of the  
6 present invention; and

7 Fig. 2 is a simplified perspective view of one type of  
8 equipment that is suited for use in performing the method of the present  
9 invention in generating the displayed image of the type shown in Fig. 1.  
10



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1     **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

2             Referring first to Fig. 1 of the drawing in some detail, it  
3     may be seen that the reference numeral 10 has been used therein to identify  
4     an image display medium of any known type, such as a TV monitor screen,  
5     a sheet of paper or the like, as will be discussed below. The image display  
6     medium 10 is shown to actually display or carry an image 11, the latter  
7     constituting an important factor in the implementation of the present  
8     invention.

9             More particularly, as mentioned before, the present invention  
10    is concerned with a method of apprising a health professional who is about  
11    to conduct a medical examination and/or treatment of a patient, especially  
12    one whom this professional did not examine before, about the overall  
13    health of that patient. To this end, the display 11 shows, besides other  
14    information, like the patient's name for identification purposes, age, sex  
15    etc., a plurality of bars 12 often of different lengths, each one of them  
16    denoting the extent to which a different one of the various systems of the  
17    human body (e.g. cardiovascular, pulmonary, glandular, skeletal, and even  
18    cerebral and/or mental) has been affected in the past by any one of many  
19    conditions that may still have some reflection in or effect on the overall  
20    health state of the patient at the time of the examination, even though many  
21    years may have elapsed since that condition has been diagnosed and treated  
22    for the first or even the last time. As used herein, the term "condition" is  
23    intended to embrace not only identifiable illnesses, diseases, afflictions,  
24    impairments or the like, but also other factors known to have possible  
25    impact on the overall health of the patient. Such other factors may include,  
26    for instance, allergies (e.g. to penicillin or bee stings), habits (such as  
27    smoking, alcoholism or the like), or even genetic factors (family history of  
28    cancer, heart or lung problems and the like), to the extent that they may  
29    predispose the respective patient to certain ailments or otherwise adversely

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1     affect his or her long-term health.

2             It will be realized that the image 11 of the kind shown in  
3     Fig. 1, or containing the same information but having the shape of the so-  
4     called pie chart or the like, provides a quick, at-a-glance guide to the  
5     doctor or other health professional, alerting him or her to possible  
6     problems with all of the patient's body systems, even those that do not  
7     constitute the subject of the current visit or hospitalization. This will help  
8     the professional in several respects. For one, it will help in the formation  
9     of a diagnosis of the medical condition underlying the current health  
10    problem or condition (illness, organ or system impairment or failure; or the  
11    like) in that it will alert the examining physician or other health  
12    professional or service provider to conditions affecting all systems of the  
13    patient's body, not only that which may fall into the area of expertise of  
14    that provider. Now, it often happens that an illness, especially a systemic  
15    one, manifests itself in various ways, often affecting more than one body  
16    system. Knowing which systems of the particular patient have been  
17    affected in the recent or even distant past may give the examining doctor  
18    important clues helping him or her to eliminate some of the possibilities of  
19    conditions with similar symptoms and to more rapidly and correctly zero  
20    in on the actually existing condition.

21            Another advantage will be encountered in the treatment  
22    stage. So, for instance, if an examining nephrologist is alerted to the fact  
23    that a particular patient has had a history of heart problems, he will  
24    immediately give preference to other, possibly less promising, treatments  
25    for kidney stones (such as ultrasound disintegration) over invasive surgery  
26    or other procedures involving total anaesthesia, in order not to unduly  
27    burden the patient's weakened heart. Of course, in most instances this  
28    impediment would have been discovered during examinations or tests  
29    routinely conducted prior to such surgical stone removal; yet, it is always

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1 better to know of the existence of such impairment beforehand, especially  
2 since it may eliminate the need for running some of such tests.

3 Now, it should be clear that, for the method of the present  
4 invention to work properly, the patient must "walk in" into the doctor's  
5 office, clinic or hospital with some information concerning his or her past  
6 medical history. At the very least, that information must include the  
7 directions needed for accessing at least some of the data stored in a data  
8 base located off-premises as to that patient's medical history. While the  
9 examining professional will probably wish to familiarize himself or herself  
10 with all crucial details of the patient's medical history that may have a  
11 bearing on the current diagnosis and/or treatment, it is not necessary for  
12 the approach proposed in accordance with the present invention to be  
13 successful that so much detail be made available to the examining  
14 professional immediately. Rather, it is sufficient to provide the doctor at  
15 that initial stage merely with an amount of information sufficient to alert  
16 him or her to the possibilities and detriments, and to send him or her on  
17 the correct path of inquiry. The graph or image 11 appearing on the  
18 display 10 is an ideal vehicle for achieving this purpose.

19 Yet, for the graph 11 to be meaningful, it is imperative that  
20 it convey all the available information of the character here under  
21 consideration (i.e. the information that will be referred to herein as  
22 "evaluation data"), and in a proper relationship between different  
23 categories. For this purpose, it is proposed in accordance with the present  
24 invention to develop individual scales for the conditions afflicting the  
25 various human body systems, and to place the various conditions  
26 encountered in that category on the scale in accordance with their  
27 seriousness (from benign to life threatening) as determined by the character  
28 (i.e. potential for causing harm) and the severity (i.e. the degree of  
29 progress of the disease or affliction) of the respective condition. Thus, on

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1 a scale from 0 to 10 (with 0 indicating either that a condition does not exist  
2 or that the patient has not been examined for that condition, and 10  
3 denoting danger of imminent death), a particular condition (e.g. coronary  
4 artery constriction, obstruction or blockage) may start at, say, 3 (being  
5 quite serious to begin with) and rise to, say, 8 as the condition worsens  
6 (toward endangering the patient's life). Moreover, at least in some  
7 instances, a simultaneous, or even disjointed, occurrence of two or more  
8 conditions in the same category may have a bearing on the overall severity  
9 of the patient's health problem in that category. So, for instance, past  
10 occurrence of pneumonia in a patient who at that time was already  
11 suffering of a mild case of emphysema may have resulted in more damage  
12 to the pulmonary system of such patient than it would have had there been  
13 no emphysema to begin with. Therefore, at least some of such  
14 combinations of conditions may be judged in their own right as to their  
15 placement on the scale for the particular category. To give an example, if  
16 each of the emphysema and the pneumonia individually did not exceed the  
17 rating of 2, the aforementioned past concurrent existence of such conditions  
18 in the particular patient may warrant attribution of a seriousness rating of  
19 3 (or 4 or 5, depending on circumstances) to the combination. Such scales  
20 are established for each system (category) on the basis of past experience  
21 or of statistics compiled from as big a population suffering the condition  
22 (or combination) as is possible or feasible.

23           Once these scales have been established and the health  
24 professionals have become aware of them and started using them, they are  
25 expected to enter the evaluation data developed during the examination of  
26 their patients into the system, to make such information relating to  
27 individual patients available to other health professionals as well. An  
28 important incentive for entering such evaluation data into the system is that  
29 each physician or other medical practitioner is also a potential beneficiary

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1 of the system in that he or she will be apprised of conditions discovered  
2 with respect to a particular patient by other doctors or the like. Yet,  
3 additional inducements of monetary nature, either to reimburse the  
4 providers for extra expenses incurred, or as additional incentives for using  
5 the system, may also be provided by the system administrator or a similar  
6 organization.

7           Moreover, it is contemplated to use the thus entered  
8 evaluation data cumulatively, ordinarily without attribution to individual  
9 patients, for amending the scales or the positions of the various conditions  
10 on them if necessary or desirable. This may be useful for reflecting new  
11 developments in the medical field, such as discovery of promising  
12 treatments or even cures for certain conditions that affect the prognosis for  
13 (and hence the rated seriousness of) such conditions. It may also play an  
14 important role in developing the rating criteria as more experience is  
15 gained; this could involve relatively rare conditions or conditions with  
16 relatively short history (such as AIDS was just a few years ago), where the  
17 original background data is too sparse to be statistically reliable. In this  
18 case, the evaluation data entered into the system after the establishment of  
19 the original position of the respective condition on the scale for that  
20 category may be used to revise such positioning, if warranted by the thus  
21 gathered information.

22           To permit easy comparison, the graduations of the scales for  
23 the various categories are to be substantially the same, which means that  
24 conditions of similar degree of seriousness will have the same scale number  
25 assigned to them regardless of which of the categories they happen to fall  
26 into, and a comparable rise in the severity of the respective condition will  
27 have substantially the same effect on the rise in its position on the scale in  
28 each of the categories. So, for instance, if emphysema and angina pectoris  
29 in their initial stages were rated at, say, 2 because they would be rated to

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1 be rather mild at that stage, they would both rise to, for instance, 5 as their  
2 severity increased in the same proportion.

3 Fig. 2 of the drawings shows one type of apparatus 20 that  
4 is suited for the performance of the method of the present invention. The  
5 apparatus 20 includes certain components that have been depicted in the  
6 drawing in a rather simplified manner because they are either totally  
7 conventional, or modified relative to similar ones currently used in  
8 different applications only to the extent necessary to implement the present  
9 invention. These components include an information processor or  
10 computer 21, and either one or both of two output devices depicted in the  
11 drawing, namely, a monitor 22 having a display screen 23, and a printer  
12 24 that is capable of printing on a sheet of paper 25 or a similar medium.  
13 These components are conventional and perform their respective functions  
14 in the customary manner.

15 However, the apparatus 20 as depicted in the drawing also  
16 includes another component which is not necessarily a standard computer  
17 accessory, namely, a card reader 26, though card readers have, of course,  
18 been used heretofore with computers in specific applications. As shown,  
19 the card reader 26 has a slot 27 that is capable of receiving, or having  
20 pulled therethrough, at least a portion of a (plastic) card 28. As is well  
21 known in conjunction with credit or debit cards used in the banking  
22 industry or in other contexts, the card 28 may be provided with a magnetic  
23 strip 29 carrying certain information relating to the patient. This  
24 information is to be read, in a known way, by the reader 26 after the  
25 portion of the card 28 provided with the strip 29 is inserted in the proper  
26 manner into the slot 27. The thus retrieved information is then to be  
27 supplied through a connecting cable 30 to the information processor 21  
28 where this information is processed in a manner that will be explained  
29 below and forwarded, through a (respective) cable 31 or 32, to that of the

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1 display devices 22 and 24 that is actually provided and to be used.

2           The information recorded on the recording medium  
3 constituted by the magnetic strip 29 may be nothing more than an  
4 identification of the particular patient, such as, for instance, that patient's  
5 social security number, possibly followed by a personal identification  
6 number (PIN) chosen by or for such patient. Yet, the PIN need not be  
7 recorded on the card 28; rather, it may be available to the patient in some  
8 other manner, such as being committed to his or her memory. In that case,  
9 that information will have to be entered into the processor 21 in some other  
10 manner, such as through a (non-illustrated) numeric or alphanumeric  
11 keyboard of any known construction. Where the information on the  
12 magnetic strip 29, either alone or in conjunction with the other, such as  
13 verbal, information provided by the patient, is merely an identification of  
14 the patient, such information merely serves as a "key" to gain access to  
15 other information stored elsewhere, such as in a central or distributed  
16 repository of information to which the processor 21 has access through  
17 respective telephone or similar connecting lines (not shown). More  
18 particularly, while the processor 21 may be capable of communicating with  
19 a remote data base containing such other information with respect to the  
20 particular patient, it will typically not be able to gain actual access to such  
21 patient's information unless it provides the data base with certain  
22 identifying information (electronic data), including that concerning the  
23 "key" which is utilized to "unlock" the patient's medical history "file" (or  
24 at least a portion thereof) for forwarding to the requestor's processor 21.

25           On the other hand, the machine-readable information that is  
26 recorded on the card 28 (such as on the magnetic strip 29 or in or on a  
27 different information storage medium) may constitute or be descriptive of  
28 the aforementioned evaluation data needed to form the displayed image 11  
29 on the display 10, be it the screen 23 or the sheet of paper 25. In that

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1 case, such evaluation data can be retrieved from the strip 29 directly by the  
2 reader 26, and there is no need for the computer 21 to communicate with  
3 any outside information repository. In this situation, however, it is  
4 desirable to render it possible to update the information carried on the card  
5 28, preferably in a simple manner, and directly on the premises. To this  
6 end, the card reader 26 may double as an information recording device  
7 usable for either replacing the previous information recorded on the strip  
8 29 by a new one, or adding such new information to the old one. In the  
9 alternative, another device separate and distinct from the card reader 26  
10 may be provided for this updating purpose. Devices of this type are  
11 currently being used, for instance for decrementing pre-paid amounts  
12 recorded on credit cards or fare cards, so that no further details need be  
13 presented here.

14 It is also contemplated to expand on this aspect of the  
15 present invention by using, instead of the card 28 provided with the  
16 magnetic strip 29 whose storage capacity is rather limited, a so-called  
17 "smart card" (i.e. a basically passive information storage device having a  
18 memory chip incorporated therein) from which stored information can be  
19 retrieved by an appropriate reader of a known construction. Since the  
20 storage capacity of such smart card exceeds that of a magnetic strip card  
21 by many orders of magnitude, the information stored thereon can go well  
22 beyond the aforementioned evaluation data. So, for instance, a card of this  
23 type can contain a complete medical record of the respective patient so that  
24 an examining health professional will not have to retrieve this information  
25 from an outside repository either. Rather, he or she will be able to obtain  
26 as much of it as needed from the smart card itself, with the patient's  
27 permission.

28 Of course, even in this scenario, recording means of known  
29 construction may be provided for use directly on the premises for updating



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1 the information recorded on the smart card, either by supplanting or, more  
2 often than not, by supplementing at least the evaluation data carried on the  
3 smart card, whenever there is an amendment or addition to be recorded in  
4 any of the categories to indicate either a change in the severity of a  
5 continuing condition, or the appearance of a previously undiagnosed  
6 condition, or the return or recurrence of a previously diagnosed but  
7 dormant or presumably cured condition. Obviously, if the card carries  
8 other medical information besides the evaluation data, provisions may be  
9 made for updating such other medical information as well, in any manner  
10 that is well known to those familiar with data storage and retrieval. This  
11 may involve the use of equipment available on the premises of the medical  
12 service provider. Yet, in an alternative, the "smart card" may actually be  
13 constructed as a so-called "super smart card" which contains, in addition  
14 to memory, a miniature keyboard for entering information and processing  
15 circuitry for processing such information and storing it in appropriate  
16 storage locations of the card, as is also known. In this case, at least the  
17 evaluation data may be updated, when such updating is called for, through  
18 the keyboard and associated processing circuitry provided directly on the  
19 card.

20 The medical and related data contained in the system  
21 established for the performance of the method of the present invention may  
22 advantageously be used for other purposes than those mentioned before as  
23 well. Thus, depending on how much data is stored on the system and  
24 where, the evaluation data displayed in accordance with the present  
25 invention may be used by the doctor or other health professional not only  
26 as an overview of the patient's health but also as a starting point or a road  
27 map for exploring in more detail the medical history records of those areas  
28 in which the patient had had problems before, especially if they were  
29 serious and/or severe. Also, if all historical records are kept for at least

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1 the evaluation data, the course of an illness, disease or the like can be  
2 followed by "flipping through" such historical records to see if there were  
3 changes in the rating for one or more of the categories and what they were,  
4 or by generating graphs or similar display images showing the rating for  
5 the category of interest versus time.

6 Moreover, if the information carried on the card includes  
7 more than just the aforementioned patient identification and/or evaluation  
8 data, and the health service provider who is about to conduct an  
9 examination of, or prescribe a treatment for, the particular patient is  
10 permitted to access more detailed medically related information as a result,  
11 such person is enabled to acquire as much of additional detailed knowledge  
12 as is relevant, in his or her judgment, for assessing the patient's condition  
13 or needed to form the correct medical diagnosis, opinion and/or conclusion  
14 relative to the particular patient. To facilitate this task, the bars 12 or  
15 other features of the image 11 appearing on the screen 23 of the monitor  
16 23 can be used, in a well-known manner, as "icons" to permit the user of  
17 the system, for instance by using a mouse to "click" on them, to gain  
18 access to such more detailed information concerning the category associated  
19 with the particular bar 12 or image feature. Once this access is obtained,  
20 that person may then "flip through" the more detailed records to the extent  
21 considered necessary.

22 As mentioned above, the card 28 may carry, if the available  
23 data storage capacity permits it, additional or auxiliary data concerning  
24 further medically relevant factors besides the evaluation data and/or the  
25 more detailed previous disease and treatment information. Such auxiliary  
26 data may include, besides the aforementioned allergy, family disease  
27 propensity and similar information, identification of doctors of record,  
28 listing of tests performed or radiographic, sonographic or similar images,  
29 EKG, EEG or other graphic records taken in the course of such tests,

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1 information about the location of the test results or such images or graphic  
2 records, complete immunization records, log of prescribed or administered  
3 prescription drugs, accompanied with information about their efficacy in  
4 and/or contraindication for the particular patient, blood type, and similar  
5 information that may be relevant in treating or prescribing a course of  
6 treatment for a particular patient. Preferably, this auxiliary information,  
7 or at least that part of it that may result in allergic reaction in or other  
8 deleterious consequences to the particular patient, may be made accessible  
9 to anyone having the card and the proper equipment, such as an ambulance  
10 driver or attendant, even if that person is unable to access any other of the  
11 medical information carried on the card, including the evaluation data.  
12 This makes it easier to follow a procedure, even in emergency situations  
13 in which the patient is unconscious or unable to communicate, that will be  
14 proper for the particular patient by avoiding taking steps that would be  
15 inappropriate for such patient, such as giving a blood transfusion using the  
16 wrong blood type, giving unnecessary tetanus shots, or the like.

17 It has been found to be advantageous to use a relatively fine  
18 resolution (such as ten or more levels) for the individual scales, for  
19 instance to be able to follow the progress of any particular medical  
20 condition or its cure or remission by changing the its position assigned to  
21 it on the scale for its category depending on its severity. However, it is  
22 also contemplated in accordance with another facet of the present invention  
23 to assign such levels to several groups (such as normal to mild, subchronic  
24 to chronic, and severe to life-threatening) and to associate such groups with  
25 various colors, such as green, yellow and red. Then, if the equipment 22  
26 or 24 for displaying the image 11 is capable of presenting color renditions,  
27 the bars 12 are displayed in the various colors to provide the medical  
28 practitioner with an additional alert to potentially dangerous medical  
29 conditions.

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1           While the invention has been illustrated and described as  
2 embodied in a particular information processing apparatus and associated  
3 accessories, it is not intended to be limited to the details shown, since  
4 various modifications and structural changes may be made without  
5 departing in any way from the spirit of the present invention. So for  
6 instance, if the evaluation data were be stored in the aforementioned  
7 outside repository, the system and method could possibly be used without  
8 any card to begin with, in that all of the information (e.g. both the social  
9 security number and the PIN) needed to "unlock" (i.e. gain access to) the  
10 evaluation data could be furnished by the patient, either from memory or  
11 by referring to a written record thereof.

12           Without further analysis, the foregoing will so fully reveal  
13 the gist of the present invention that others can, by applying current  
14 knowledge, readily adapt it for various applications without omitting  
15 features that, from the standpoint of prior art, fairly constitute essential  
16 characteristics of the generic and specific aspects of the contribution to the  
17 art and, therefore, such adaptations should and are intended to be  
18 comprehended within the meaning and range of equivalence of the claims.

19           What is claimed as new and desired to be protected by  
20 Letters Patent is set forth in the appended claims.

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**CLAIMS:**

I claim:

1. A method of apprising health professionals about the general state of health of their patients, comprising the steps of

a. conducting at least one medical examination of the respective patient for the existence of conditions affecting the patient's health;

b. evaluating the results of the medical examination, including

i. assigning any particular one of such conditions that was found to exist in the respective patient to one of a predetermined number of categories each relating to a different one of various human body systems,

ii. rating the seriousness of each such particular condition within the category to which it is assigned on a seriousness scale specific to that category, and

iii. recording at least evaluation data indicative of the results of said assigning and rating steps regarding the respective patient on a recording medium suitable for access by other health professionals; and

c. utilizing the thus recorded evaluation data during a subsequent medical examination of the respective patient to alert an examining health professional to possible health problems of such patient, including

i. accessing the data previously recorded on the recording medium regarding the respective patient as an appurtenant to such subsequent examination,

ii. retrieving from the recording medium

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1 at least the previously recorded evaluation data regarding the respective  
2 patient; and

3 iii. generating at least one visually  
4 perceptible report that displays the thus retrieved evaluation data by  
5 category and rating.  
6

7 2. The method as defined in claim 1, further comprising  
8 the step of coordinating the scales of all of the categories with one another  
9 to be commensurate with one another such that conditions of comparable  
10 seriousness are rated the same regardless of their category; and wherein  
11 said generating step includes displaying said evaluation data graphically by  
12 category and position on the respective scales with substantially the same  
13 graduations for all of the scales.  
14

15 3. The method as defined in claim 2, wherein said  
16 coordinating step includes collecting background information about all of  
17 the conditions that may afflict each of the various human body systems,  
18 and using such background information for attributing to each of such  
19 conditions a numerical value expressing the seriousness of such conditions  
20 relative to others in the same category, and the severity of each such  
21 condition; and wherein said rating step includes determining the severity  
22 of said particular condition to ascertain said numerical value therefor.  
23

24 4. The method as defined in claim 1, wherein said  
25 recording step includes storing said evaluation data on a data storage card  
26 issued to the particular patient; and wherein said retrieving step includes  
27 reading said evaluation data from the data storage card.  
28

29 5. The method as defined in claim 4, and further

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1 comprising the step of providing an evaluation data update upon the  
2 conclusion of the medical examination; and wherein said recording step  
3 includes storing such evaluation data update on the data storage card.  
4

5           6.     The method as defined in claim 1, wherein said rating  
6 step includes giving each condition encountered in a particular patient  
7 during the medical examination a rating on one of a multiplicity of different  
8 levels of the respective scale that is indicative of the character and severity  
9 of such condition.  
10

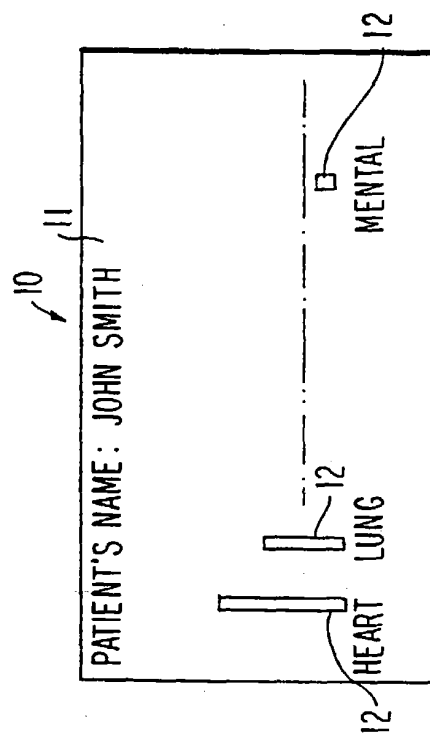
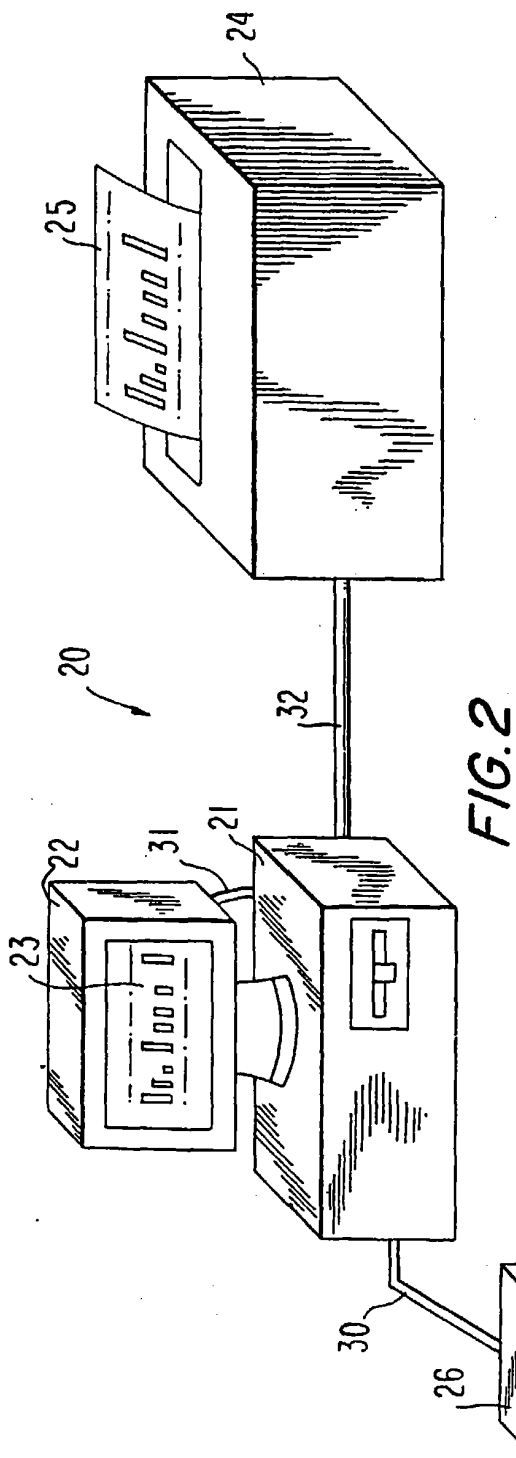
11           7.     The method as defined in claim 6, wherein said rating  
12 step further includes assigning said levels to different adjacent groups each  
13 containing a sequence of said levels of progressively increasing seriousness  
14 of the condition.  
15

16           8.     The method as defined in claim 7, wherein said rating  
17 step further includes associated each of said groups with a different color;  
18 and wherein said generating step includes forming said report as a color  
19 image differentiating said groups by said colors assigned thereto.

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US95/03491

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC(6) : G06F 17/60 US CL : 364/401 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) U.S. : 364/401, 224.5, 224.6, 413.02; 283/900		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Computer Select Database, Dialog Search terms: smart card, medical record, rank severity, rate severity		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	IEEE/IEEE Publications Ondisc, 1992, Arthur Kaufman and Lloyd H. Woodward, "Plustag-Magic Medical Record System", pp. 165-167, especially page 167	1-8
Y	US, A, 4,464,122 (FULLER ET AL) 07 August 1984, Abstract, col 6, line 32 - col 7, line 28, col. 10, lines 20-61.	1-8
A	US, A, 4,975,840 (DETORE ET AL) 04 December 1990	1-3, 6-8
A	Los Angeles Times, 12 April 1993, Metro section, page 7, pt. B, col. 1, Peter J. Ognibene, " 'Smart Cards' Could Save Lives--and Dollars"	1-8
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:	*T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *A document defining the general state of the art which is not considered to be part of particular relevance *E earlier document published on or after the international filing date *L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O document referring to an oral disclosure, use, exhibition or other means *P document published prior to the international filing date but later than the priority date claimed *X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art *G document member of the same patent family	
Date of the actual completion of the international search 22 MAY 1995		Date of mailing of the international search report 06 JUL 1995
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer GAIL O. HAYES <i>Jan Hill</i> Telephone No. (703) 305-9711